WHAT IS CLAIMED IS:

1. In a computing environment, a method comprising,

receiving a function call via an interface of an object,

the object of an object model associated with a scene graph;

5   responding to the function call by causing data in the

scene graph to be modified.

2. The method of claim 1 wherein causing data in the

scene graph to be modified comprises causing initialization of

10 a new instance of a visual class.

3. The method of claim 2 wherein causing data in the

scene graph to be modified comprises invoking code to associate

a transform with a visual object in the scene graph.

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4. The method of claim 1 wherein causing data in a scene

graph data structure to be modified comprises invoking code to

place a drawing visual into the scene graph.

20   5. The method of claim 4 further comprising, causing a

drawing context to be returned, the drawing context providing a

mechanism for rendering into the drawing visual.

6.   The method of claim 2 wherein causing data in the scene graph to be modified comprises invoking code to associate brush data with a visual object in the scene graph.

5   7.   The method of claim 6 wherein the brush data comprises receiving data corresponding to a solid color.

8.   The method of claim 6 wherein receiving brush data comprises receiving data corresponding to a linear gradient

10   brush and a stop collection comprising at least one stop.

9.   The method of claim 6 wherein receiving brush data comprises receiving data corresponding to a radial gradient brush.

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10.   The method of claim 6 wherein receiving brush data comprises receiving data corresponding to an image.

11.   The method of claim 10 further comprising, receiving

20   a function call via an interface corresponding to an image effect to apply to the image.

12.   The method of claim 1 further comprising, receiving pen data in association with the function call, and wherein

25   causing data in a scene graph data structure to be modified

comprises invoking a pen function that defines an outline of a shape.

13.   The method of claim 1 wherein causing data in a scene graph data structure to be modified comprises invoking code to represent an ellipse in the scene graph data structure.

14.   The method of claim 1 wherein causing data in a scene graph data structure to be modified comprises invoking code to represent a rectangle in the scene graph data structure.

15.   The method of claim 1 wherein causing data in a scene graph data structure to be modified comprises invoking code to represent a path in the scene graph data structure.

16.   The method of claim 1 wherein causing data in a scene graph data structure to be modified comprises invoking code to represent a line in the scene graph data structure.

17.   The method of claim 1 wherein causing data in a scene graph data structure to be modified comprises invoking code related to hit-testing a visual in the scene graph data structure.

18. The method of claim 1 wherein causing data in a scene graph data structure to be modified comprises invoking code to transform coordinates of a visual in the scene graph data structure.

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19. The method of claim 1 wherein causing data in a scene graph data structure to be modified comprises invoking code to calculate a bounding box of a visual in the scene graph data structure.

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20. The method of claim 1 wherein causing data in a scene graph data structure to be modified comprises invoking code to place a visual object in the scene graph data structure.

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21. The method of claim 1 further comprising invoking a visual manager to render a tree of at least one visual object to a rendering target.

22. The method of claim 1 wherein causing data in a scene graph data structure to be modified comprises invoking code to

20 place a container object in the scene graph data structure, the container object configured to contain at least one visual object.

23. The method of claim 1 wherein causing data in a scene graph data structure to be modified comprises invoking code to place image data into the scene graph data structure.

5   24. The method of claim 23 wherein causing data in a scene graph data structure to be modified comprises invoking code to place an image effect object into the scene graph data structure that is associated with the image data.

10   25. The method of claim 1 wherein causing data in a scene graph data structure to be modified comprises invoking code to place data corresponding to text into the scene graph data structure.

15   26. The method of claim 1 wherein causing data in a scene graph data structure to be modified comprises invoking code to provide a drawing context in response to the function call.

27. The method of claim 26 wherein the function call
20   corresponds to a retained visual, and further comprising, calling back to have the drawing context of the retained visual returned to the scene graph data structure.

28. The method of claim 1 wherein causing data in a scene
25   graph data structure to be modified comprises invoking code to

place a three-dimensional visual into the scene graph data structure.

29.   The method of claim 28 wherein causing data in a scene graph data structure to be modified comprises invoking code to map a two-dimensional surface onto the three dimensional visual.

30.   The method of claim 1 wherein causing data in a scene graph data structure to be modified comprises invoking code to place animation data into the scene graph data structure.

31.   The method of claim 30 further comprising communicating timeline information corresponding to the animation data to a composition engine.

32.   The method of claim 31 wherein the composition engine interpolates graphics data based on the timeline to animate an output corresponding to an object in the scene graph data structure.

33.   The method of claim 1 wherein receiving a function call via an interface comprises receiving markup, and wherein causing data in a scene graph data structure to be modified

comprises parsing the markup into a call to an interface of an object.

34.   The method of claim 1 wherein causing data in a scene
graph data structure to be modified comprises invoking code to place an object corresponding to audio and/or video data into the scene graph data structure.

35.   The method of claim 1 wherein causing data in a scene
graph data structure to be modified comprises invoking code to change a mutable value of an object in the scene graph data structure.

36.   In a computing environment, a system comprising:
      a scene graph data structure containing data that can be rendered into integrated output that can be viewed; and
      an object model including visual objects and other data that can be contained in the scene graph data structure.

37.   The system of claim 36 wherein at least one function of an object of the object model is invoked to place a tree of visual objects into the scene graph data structure.

38.   The system of claim 37 further comprising a visual manager that when invoked renders the tree of visual objects to a rendering target.

5   39.   The system of claim 37 wherein the tree of visual objects is contained in a visual collection object.

40.   The system of claim 26 wherein at least one function of an object of the object model is invoked to place the visual

10   object into the scene graph data structure.

41.   The system of claim 40 wherein at least one function of an object of the object model is invoked to associate a brush with the visual object.

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42.   The system of claim 40 wherein at least one function of an object of the object model is invoked to associate a geometry with the visual object.

20   43.   The system of claim 42 wherein the geometry comprises at least one of a set containing an ellipse geometry, a rectangle geometry, a line geometry and a path geometry.

44. The system of claim 40 wherein at least one function of an object of the object model is invoked to associate a transform with the visual object.

45. The system of claim 44 wherein the transform comprises a rotate transform for changing a perceived angle of the visual object.

46. The system of claim 44 wherein the transform comprises a scale transform for changing a perceived size of the visual object.

47. The system of claim 44 wherein the transform comprises a translate transform for changing a perceived position of the visual object.

48. The system of claim 44 wherein the transform comprises a skew transform for changing a perceived skew of the visual object.

49. The system of claim 44 further comprising animation information associated with the transform, and wherein the animation information causes transformation data associated with the transform to change over time thereby animating the transformation of the visual object over time.

50. The system of claim 40 wherein at least one function of an object of the object model is invoked to associate a color with the visual object.

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51. The system of claim 40 wherein at least one function of an object of the object model is invoked to associate gradient data with the visual object.

10   52. The system of claim 40 wherein at least one function of an object of the object model is invoked to associate a tile brush with the visual object.

53. The system of claim 40 wherein at least one function 15 of an object of the object model is invoked to associate an image with the visual object.

54. The system of claim 40 wherein at least one function of an object of the object model is invoked to associate three- 20 dimensional data with the visual object.

55. The system of claim 40 wherein at least one function of an object of the object model is invoked to associate a drawing comprising drawing primitives with the visual object.

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56. The system of claim 40 wherein at least one function of an object of the object model is invoked to associate audio and/or video media d with the visual object.

57. The system of claim 40 wherein at least one function of an object of the object model is invoked to associate an image effect with the visual object.

58. The system of claim 40 wherein at least one function of an object of the object model is invoked to associate a pen with the visual object, to describe how a shape is outlined.

59. The system of claim 40 wherein at least one function of an object of the object model is invoked to obtain a drawing context associated with the visual object.

60. The system of claim 40 wherein at least one function of an object of the object model is invoked to associate hit testing data with the visual object.

61. The system of claim 40 wherein at least one function of an object of the object model is invoked to associate a rectangle with the visual object.

62. The system of claim 61 wherein at least one function
of an object of the object model is invoked to describe how a
source rectangle should be stretched to fit a destination
rectangle corresponding to the visual object.

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63. The system of claim 61 wherein at least one function
of an object of the object model is invoked to describe how
content is positioned vertically within a container
corresponding to the visual object.

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64. The system of claim 61 wherein at least one function
of an object of the object model is invoked to describe how
content is positioned horizontally within a container
corresponding to the visual object.